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HAYES SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718			FREAY, CHARLES GRANT	
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/786,718
Filing Date: February 24, 2004
Appellant(s): BANISTER, MARK

Norman P. Soloway
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 23, 2010 appealing from the Office action mailed November 23, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 2, 3, 5-21, 24-61 and 63-78 are pending in the application. Claims 8-14, 16, 18 and 27-57 are withdrawn from consideration. Claims 2, 3, 5-7, 15, 17, 19-21, 24-26, 58-61 and 63-78 stand rejected.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being

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maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

5,192,197	Culp	3-1993
5,961,298	Bar-Cohen et al	10-1999
6,004,115	da Costa	12-1999
6,685,442	Chinn et al	2-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

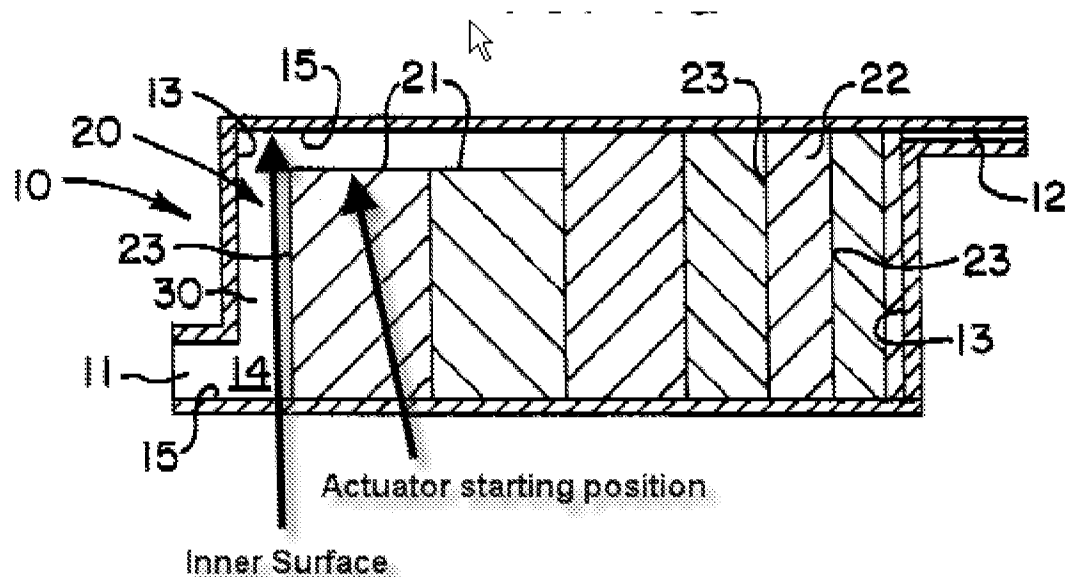
1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 3, 15, 17, 19-21, 24-26, 58-61, 63-65 and 70-78 stand rejected under 35 U.S.C. 103(a) as being unpatentable over da Costa (USPN 6,004,115) in view of Chinn et al (USPN 6,685,442) and Bar-Cohen (USPN 5,961,298).

The da Costa reference discloses a pump for moving a fluid comprising an actuator housing 13 having a chamber 14, 15 housing the fluid. The chamber having an inner surface (noted in the figure below) and an outlet port 12 for accommodating fluid flow through the chamber. There are a plurality of individual actuators 20 arranged contiguously in series and located in the chamber opposite to the inner surface and in contact with the fluid. As shown in figures 1a-1f the successive actuators in the series are sequentially expanded from the starting position (the position of the pistons 21, retracted away from the inner surface of the wall in the figure below) toward the inner surface of the chamber to advance the flow of the fluid through the chamber and out outlet port 12. There is an activator including a controller (see the first full paragraph of col. 5) for controlling the actuation at a predetermined time and rate.



The da Costa reference does not disclose that the actuator material is an electroactuated polymer gel, encased in an essentially inert material which is semi-permeable to electrolytes, the encasing material being non-permeable or the actuators being electrically shielded from a contiguous actuator. Further, da Costa does not set forth that the fluid is a liquid or disclose plural of the chambers in flow connection.

Chinn et al discloses an actuator, which may be used as a pump (see for example, col. 2 line 2 and also col. 6 line 67 to col. 7 line 9) and includes an electro-actuated polymer gel (see for example col. 1 lines 35-38) housed in a non-conductive housing. The gel 10 is encased in a housing 20 (note for reference purposes Figs. 6A, 7-9B and 10C and also note col. 6 line 3-36). The housing being chemically inert (col. 6 lines 9, 31 and 32) and the gel being encased by a member 24 which is semi-permeable to the electrolyte. Note especially from col. 5 line 55 to col. 6 line 36.

The Bar-Cohen et al reference discloses a similar traveling wave pump having a contiguous series of actuators 108 in contact with a fluid that is being pumped. Bar-Cohen et al note that the fluid can be a liquid or a gas (see line 2 of the Abstract at least) and also discloses plural chambers which either are or could be connected in a flow connection in Figs. 5-9. At the time of the invention it would have been obvious to one of ordinary skill in the art to substitute the plural actuators such as taught by Chinn et al for the actuators of da Costa since such a substitution would result in a miniature fluid device that is actuated with low electrical potentials and has significant performance characteristics (see col. 1 lines 30-35 and col. 2 lines 17-28 of Chinn). Additionally, it would have been obvious to one of ordinary skill in the art at the time of the invention that the pumping arrangement could be easily modified to pump liquids as taught by Bar-Cohen et al simply by making the actuators of similar size.

With regards to claim 2 and 64 it is noted that it would have been obvious to place plural of the structures together in a single housing, as taught by Bar-Cohen et al, and arrange them in either series for increased pressurization or in parallel for increased flow or for the mixing of two fluids.

Claims 5-7 and 65-69 stand rejected under 35 U.S.C. 103(a) as being unpatentable over da Costa in view of Chinn and Bar-Cohen et al as applied to claims 58, 63 and 59 above, and further in view of Culp (USPN 5,192,197).

As set forth above da Costa in view of Chinn and Bar-Cohen et al discloses the invention substantially as claimed and furthermore da Costa at col. 5, the two first full

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paragraphs, teaches of the use of a controller. Da Costa does not set forth that the controller is a programmable microprocessor which responds to a sensor sensing a property such as temperature or pressure. Culp at col. 4 line 61 through col. 5 line 15 teaches of a programmable electric controller which is responsive to a sensor sensing properties such as pressure or temperature. At the time of the invention it would have been obvious to one of ordinary skill in the art to utilize a programmable controller and sensor arrangement such as taught by Culp as the da Costa controller to allow for increased control and applicability of the system to a variety of uses and environments.

(10) Response to Argument

Before presenting the arguments against the rejections the Appellant provided, at item 4, a Discussion of the Cited References beginning at page 11. In summarizing the references the Appellant noted that the da Costa reference is directed to a compressor and that Bar-Cohen et al discloses a traveling wave pump where driven and fixed plates do not contact the fluid (according to the Appellant). The examiner will discuss each of these references below. The appellant also summarized the Chinn et al reference by stating that "Chinn is not a pump". The Examiner must respectfully disagree. Chinn et al clearly states that it is directed to an actuator gel which can be used either to drive a valve or a pump (see for example col. 2 lines 1-3 and col. 3 lines 16 and 17) and further provides a specific example of the device as a pump (see Fig. 10C and col. 6 line 62 through col. 7 line 9). Therefore Chinn et al teach that the disclosed device is a pump.

The Appellant makes the following arguments with regards to the above rejections:

1) The Appellant argues that the “combination of references fails to disclose every requirement of claim 58” (see page 14 of the Appellant’s Brief on Appeal). The Appellant argues that the Examiner acknowledges that neither da Costa nor Chinn et al teach “a plurality of individual actuators arranged contiguously in series and located in the chamber opposite to the inner surface and in contact with the liquid”. Further the Appellant makes the statement that “(t)he Examiner does not contend that any other reference teaches a plurality of individual actuators arranged contiguously in a series, and in contact with the liquid”. See at page 14 the first full paragraph of the Appellant’s Brief on Appeal, hereafter referred to as the Appeal Brief.

From the second paragraph of page 14 of the Appeal Brief and extending to page 16 line 5 the Appellant provides an extended and detailed analysis of the structure of the Bar-Cohen et al reference and how it reads on the structure set forth in the claims;

2) The Appellant argues that the da Costa, Chinn et al and Bar-Cohen et al references are not suitable for combination because da Costa is directed to a compressor for a refrigeration system. The Appellant then asserts that since da Costa is a compressor one of ordinary skill in the art would not find its teachings relevant to a pump and any modification would make da Costa inoperable; and,

3). In item 7 (with regards to claim 63), item 8 (with regards to claims 2, 3, 15, 17, 19-21, 24-26, 59-61 and 70-78), and item B (with regards to claims 5-7 and 65-69) the Appellant argues that the noted claims are patentable for the reasons set forth with regards to claim 58 in Argument 1) and Argument 2) above.

The examiner respectfully disagrees with the Appellant's arguments and finds them non-persuasive for the following reasons.

In response to Argument 1) that the Examiner acknowledges that neither da Costa nor Chinn et al teach "a plurality of individual actuators arranged contiguously in series and located in the chamber opposite to the inner surface and in contact with the **liquid**" (emphasis added by the Examiner). The Examiner notes that this statement is correct based solely upon the last word of the statement, i.e. liquid. The Examiner notes that what the rejection sets forth, and what the Examiner does acknowledge and assert, is that da Costa in view of Chinn et al teach of "a plurality of individual actuators arranged contiguously in series and located in the chamber opposite to the inner surface and in contact with the **fluid**". The Examiner makes a similar observation with regards to the Appellant's argument that it is not contended by the Examiner that any other reference teaches a plurality of individual actuators arranged contiguously in a series, and in contact with the **liquid**. The Examiner notes that da Costa in view of Chinn does teach that a plurality of individual actuators are arranged contiguously in a series, and in contact with a **fluid**.

As is commonly known a fluid can be either a gas or a liquid. It is also commonly understood that pumps operate on fluids, both gasses and liquids. The group of pumps known as compressors are a subset of the larger set of pumps. A compressor being a pump which operate on a gas and also reduces the volume of the gas as it travels through the pump. As evidence that one of ordinary skill in the art would understand that the teachings of the da Costa reference are applicable to pumps in general, and not just refrigerant compressors, da Costa in the background section at column 1 lines 51-54 discusses USPN 5,271,724 which is directed to a pump for liquids. The da Costa reference also refers to the operation it performs as a “pumping operation”, see col. 3 lines 48-52. One of ordinary skill would find the teachings of the da Costa reference applicable to pumps for a liquid.

Nowhere in the Appeal Brief does the Appellant present any argument with regards to or against the combined teaching of da Costa in view of Chinn et al. Thus the Appellant acknowledges in the Appeal Brief that da Costa in view of Chinn et al teach and make obvious "a plurality of individual actuators arranged contiguously in series and located in the chamber opposite to the inner surface and in contact with the *fluid*".

Secondly, with regards to the Bar-Cohen et al reference the Appellant argues that the reference does not disclose a plurality of individual actuators that are in contact with the liquid. The examiner respectfully disagrees. The claims do not set forth that the actuators are in direct contact with the liquid or fluid. In Bar-Cohen et al the actuators are in contact with the fluid through the driven plate 102. As noted in the rejection set

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forth above and in the Final Rejection of November 23, 2010, what the Bar-Cohen reference is cited for is its teaching of "a similar traveling wave pump" which is capable of pumping either a gas or a liquid. Whether it is the actuators that contact the liquid (as the Examiner argues above that they do indirectly) or not does not change the fact that Bar-Cohen et al do teach that traveling wave machines can be arranged to operate on either gasses or liquids. This is what the Examiner asserted in the rejection and what the Bar-Cohen et al reference was cited for as teaching in the rejection. The Examiner respectfully notes that the detailed structural analysis of how the Bar-Cohen et al reference relates to the claim elements has little relevance to the rejection as set forth above or in the Final Rejection of November 23, 2010. The Bar-Cohen et al reference was not cited to provide a teaching of the claimed structure. As asserted by the Examiner and acknowledged by the Appellant da Costa in view of Chinn et al teach and make obvious "a plurality of individual actuators arranged contiguously in series and located in the chamber opposite to the inner surface and in contact with the *fluid*". Thus all structural elements of the claimed invention have been taught by da Costa in view of Chinn et al. The Bar-Cohen et al reference has only been cited for its teaching that in a traveling wave pump the device can operate on a fluid which is either a liquid or a gas (the Examiner again notes the first sentence in the Abstract of the Bar-Cohen et al reference). The Appellant has provided no argument that Bar-Cohen et al does not teach that traveling wave pumps can be modified or designed to operate on either liquids or gasses and thus acknowledges that this is true.

In response to Appellant's argument that the Bar-Cohen et al reference alone does not disclose the structure of the claimed pump, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to Argument 2), the Examiner argues that one of ordinary skill in the art would not find the teachings of the da Costa reference to be limited to compressors in a refrigeration environment. The type of pump disclosed by the da Costa reference is commonly used to pump liquids and gasses. As noted by the Examiner in the remarks above compressors are pumps. A compressor being a pump which operates on a gas and also reduces the volume of the gas as it travels through the pump. As evidence that one of ordinary skill in the art would understand that the teachings of the da Costa reference are applicable to pumps in general, and not just compressors, da Costa in the background section at column 1 lines 51-54 discusses USPN 5,271,724 which is directed to a pump for liquids. The da Costa reference also refers to the operation it performs as a "pumping operation", see col. 3 lines 48-52. One of ordinary skill would find the teachings of the da Costa reference applicable to pumps for a liquid. It is further noted that da Costa provides no disclosure of any details of the refrigeration circuit to which it is applied. Da Costa only discloses details of the pump/compressor structure. Additionally, the Bar-Cohen et al reference discloses a similar traveling wave type pump and specifically notes that it can be modified to operate on either a liquid or a gas. It is

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additionally noted that the Bar-Cohen et al reference predates the da Costa reference. The Examiner argues that one of ordinary skill in the art would have understood that the teachings of the da Costa reference do not only apply to refrigeration type compressor pumps. Instead one of ordinary skill in the art would have found it routine to apply the teaching of the da Costa reference to pumps which operate on liquids in view of the common and well known application of such pumps to both liquids and gasses.

In response to Argument 3) the Examiner disagrees with this argument for the reasons set forth in response to Argument 1) and Argument 2) above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Charles G Freay/

Primary Examiner, Art Unit 3746

Conferees:

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

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